

CLAIMS

1. A plasma injector for injecting a reducing agent, wherein said plasma injector comprises a injection nozzle and a plasma generator which generates a plasma in the vicinity of a injection port at the distal end portion of said injection nozzle; and wherein said plasma injector injects a reducing agent in a liquid droplet state, and at least partially converts the reducing agent injected in a liquid droplet state into a plasma to vaporize the reducing agent.

2. The plasma injector according to claim 1, wherein said plasma generator is located at the distal end portion of said injecting nozzle.

3. The plasma injector according to claim 2, wherein said plasma is an inductive-coupling plasma; wherein said plasma generator located at the distal end portion of said injection nozzle comprises a cup-shaped member surrounding the injection port of said injection nozzle, and an inductive-coil surrounding around said cup-shaped member; and wherein said cup-shaped member is made of an electromagnetic wave-transmissive material.

4. The plasma injector according to claim 2, wherein the plasma is an electric-discharge plasma; wherein said plasma generator located at the distal end portion of the injection nozzle comprises a cup-shaped member surrounding the injection port of said injection nozzle; wherein said cup-shaped member is made of an electrically semiconductive material or an electrically conductive material; and wherein said cup-shaped member and said distal end portion of the nozzle are electrically insulated from each other to form an electrode couple together.

5. The plasma injector according to claim 1 or 2, wherein the plasma is an electric-discharge plasma, a microwave plasma or an inductive-coupling plasma.

6. An exhaust gas purifying system, wherein a reducing agent is injected upstream of a catalyst located

in an exhaust pipe; and wherein said reducing agent is injected by said plasma injector according to any one of claims 1 to 7.

5 7. The exhaust gas purifying system according to claim 6, wherein said catalyst is a NO_x purifying catalyst.

10 8. An exhaust gas purifying system, wherein a reducing agent is injected upstream of a catalyst located in an exhaust pipe by an injector; and wherein a plasma is generated in the vicinity of the injection port of said injector.

15 9. A method for injecting a reducing agent, comprising injecting a reducing agent in a liquid drop state, and then at least partially converting the reducing agent injected in a liquid drop state into a plasma to vaporize the reducing agent.